ACCESSION NR: AP4004156

developed for the assembly. Two types of heating can be used: an electric nichrome heater, which will heat the pipe uniformly at a heat flux of 5×10^6 kcal/m^2·hr, or an electron bombardment heater, which will give higher heat fluxes. Thermal expansion of the graphite parts is compensated by means of sylphon expansion joints. All parts of the assembly in contact with the aluminum are made from pyrolytic graphite. Preliminary testing for 200 hr with individual test runs of up to 12-hr duration showed the design to be satisfactory and the assembly suitable for heat transfer studies. Orig. art. has: 1 figure.

ASSOCIATION: Energeticheskiy institut im. G, M. Krzhizhanovskogo (Power Engineering Institute)

SUBMITTED: 15Apr63 DATE ACQ: 26Dec63 ENCL: 01

SUB CODE: PR NO REF SOV: 000 OTHER: 000

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L 42943-66 EWT(m)/EWP(t)/ETI IJP(c) JH/JD/WW/GD/JG

ACC NR: AT6029312 SOURCE CODE: UR/0000/66/000/000/0068/0083

AUTHOR: Filimonov, S. S.; Kryukova, M. G.; Teplov, S. V.

ORG: Power Engineering Institute im. G. M. Krzhizhanovskiy (Enegeticheskiy institut)

TITLE: Aluminum as a high temperature coolant

SOURCE: Moscow. Energeticheskiy institut. Teploobmen v elementakh energeticheskikh ustanovok (Heat exchange in power installation units). Moscow, Izd-vo Nauka, 1966, 68-83

TOPIC TAGS: ~~high temperature~~ thermal reactor, ~~reactor cooling~~, nuclear reactor, reactor coolant, ~~liquid metal~~ cooling, aluminum, ~~coolant, liquid aluminum~~, liquid ~~aluminum coolant~~ metal

ABSTRACT: Since 1959, the Power Engineering Institute im. G. M. Krzhizhanovskiy has been engaged in a study dealing with the use of liquid aluminum as a coolant for high temperature nuclear reactors. The experimental equipment and some of the results of this study are described. From the study, it was concluded that the difficulties encountered in the practical use of aluminum as a coolant can be successfully overcome, and that the heat transfer during the flow of liquid aluminum through pipes can be calculated with the equations used for calculating the heat transfer of other liquid metal coolants. Orig. art. has: 4 figures and 5 tables. [AV]

SUB CODE: 18/ SUBM DATE: 05Apr66/ ORIG REF: 016/ OTH REF: 008/ ATD PRESS:5069

Card 1/1 MLP

FEDOROVICH, Mikhail Mikhaylovich; LEOSHKIN, A.P., dotsent, kand.ekonom. nauk; POLYAKOVA, dotsent, kand.ekonom.nauk; KOVALEVA, A.M., kand. ekonom.nauk; TIKHOMIROV, V.A., dotsent, kand.tekhn.nauk, retsenzent; KOVYLIN, I.I., inzh., retsenzent; TEPLOV, T.V., prof., doktor ekonom. nauk, retsenzent; FEDORENKO, N.P., prof., doktor ekonom.nauk, retsenzent; TROITSKIY, D.A., dotsent, retsenzent; PETRUSHEV, I.M., red.; TER-STEPANYANTS, M.S., red.; GERASIMOVA, Ye.S., tekhn.red.

[Organization and planning of chemical enterprises] Organizatsiia i planirovanie khimicheskogo predpriiatiia. Moskva, Gosplanizdat, 1959. 547 p. (MIRA 12:7)
(Chemical industries)

TEPLOV, V.

Primary objectives in working out quantitative zoogeographical indices and a plan of organizing the work on birds and mammals in this direction. Vop. ekol. 4:149-150 '62. (MIRA 15:11)

1. Okskiy gosudarstvennyy zapovednik, Ryazanskaya oblast'.
(Zoogeography)

TEPLOV, V., inzh.

Construction and use for inland water transportation purposes of the Volga-Baltic waterway. Rech.transp. 20 no.4:36-38 '61. (MIRA 14:5)

(Mariinsk canal system -Inland water transportation)

YUFIN, Andrey Pavlovich, prof., doktor tekhn.nauk; BOGOMOLOV, A.I., prof., doktor tekhn.nauk, retsenzent; TEPLOV, V.A., doktor tekhn.nauk, prof., retsenzent; SAMSONOVA, M.T., red.

[Hydraulics, hydraulic machinery and hydraulic drive] Gidravlika, gidravlicheskie mashiny i gidropri vod. Moskva, Vysshaia shkola, 1965. 426 p. (MIRA 18:12)

KRAYEV, I.S., inzh.; TEPLOV, V.G.

Increase cargo transportations in mixed railroad-water communications. Rech.transp. 18 no.12:3-7 D '59. (MIRA 13:4)
(Inland water transportation) (Railroads--Freight)

TEPLOV, V.I., uchitel'

Raising tomatoes under conditions prevailing in Zlatoust. (MIRA 13:2)
Biol.v shkole no.6:89-90 N-D '59.

1. Shkola No.77 st.Zlatoust Yuzhno-Ural'skoy zheleznoy dorogi.
(Zlatoust--Tomatoes)
(Vegetable gardening--Study and teaching)

TEPLOV, V.M., inzh.

Concerning L.I. Dvoskin's article "Auxiliary power supply for the self-needs of large condensing power plants." Elek. sta. 35 no.2:93-94 F '64. (MIRA 17:6)

TEPLOVA, Ye.N.; TEPLOV, V.P.

Nutrition of pike in the upper Pechora Valley. Vop.ikht. no.1:94-103 '53. (MLRA 7:6)

1. Pechoro-Ilychskiy gosudarstvennyy zapovednik.
(Pechora Valley--Pike)

TEPLOV, V.P.

River otters in the region of Pechoro-Ilych State Preserve. (MLRA 7:1)
Biul.MOIP Otd.biol.58 no.6:7-16 '53.
(Pechoro-Ilych State Preserve--Otters)
(Otters--Pechoro-Ilych State Preserve)

TEPLOV, V.P.

Ratio of sexes among wild mammals. Zool.zhur.33 no.1:174-179 Ja-F '54. (MLRA 7:2)

1. Pechero-Ilychskiy gosudarstvennyy zapovednik. (Mammals)

TEPLOV, V.P.

Winter ecology of gluttons in districts of the Pechora-Ilych game reserve. Biul. MOIP. Otd. biol. 60 no.1:3-11 Ja-F '55. (MLRA 8:7)
(Komi A.S.S.R.—Rodentia)

TEPLOV, V.P.; KARTASHEV, N.N.

Biological bases of hunting regulations for aquatic birds in the central regions of the European U.S.S.R. Zool.zhur. 35 no.1:77-88 Ja '56. (MLRA 9:5)

1. Okskiy gosudarstvennyy zapovednik i biologo-pochvennyy fakul'tet Moskovskogo gosudarstvennogo universiteta imeni M.V. Lomonosova.
(Birds, Protection of)

TEPLOV, V.P.; TUROV, I.S.

On the importance of the carrion crow (Corvus corone L.) in bottomlands along the middle Oka River [with English summary in insert]. Zool.zhur. 35 no.5:753-757 My '56. (MLRA 9:9)

1.Omskiy gosudarstvennyy zapovednik i kafedra zoologii pozvonochnykh Moskovskogo gosudarstvennogo universiteta imeni M.V.Lomonosova.
(Oka Valley--Crows)

TEPLOV, V.P.

Feeding of the common mallard on acorns. Zool.zhur.35 no.8:1264-1265 Ag '56. (MLRA 9:10)

1.Okskiy gosudarstvennyy zapovednik.
(Ducks) (Acorns)

TEPLOV, V.P.; KARPOVICH, V.N.

Possibilities of using trail count for determining the absolute population of elk. Soob.Inst.lesa no.13:51-53 '59. (MIRA 13:2)

1. Okskiy gosudarstvennyy zapovednik.
(Elk)

PRIKLONSKIY, S.G.; TEPLOV, V.P.

Census of the abundance of capercaillie, crane and heron in the forests of the central provinces of the European part of the R.S.F.S.R. Trudy OGZ no.4:33-64 '62. (MIRA 17:9)

BOYKO, A.K.; IVANCHENKO, A.I.; KURYACHIY, L.K. [Kuriachyi, L.K.]; TEPLOV, V.P. [Tieplov, V.P.]

Age of the Kuzya series of Rakhov Massif. Dop. AN URSR no.8:1095-1098 '64. (MIRA 17:8)

1. L'vovskiy gosudarstvennyy universitet i Zakarpatskaya geologicheskaya ekspeditsiya tresta "Kiivgeologiya". Predstavleno akademikom AN UkrSSR O.S. Vyalovym [Vialov, O.S.].

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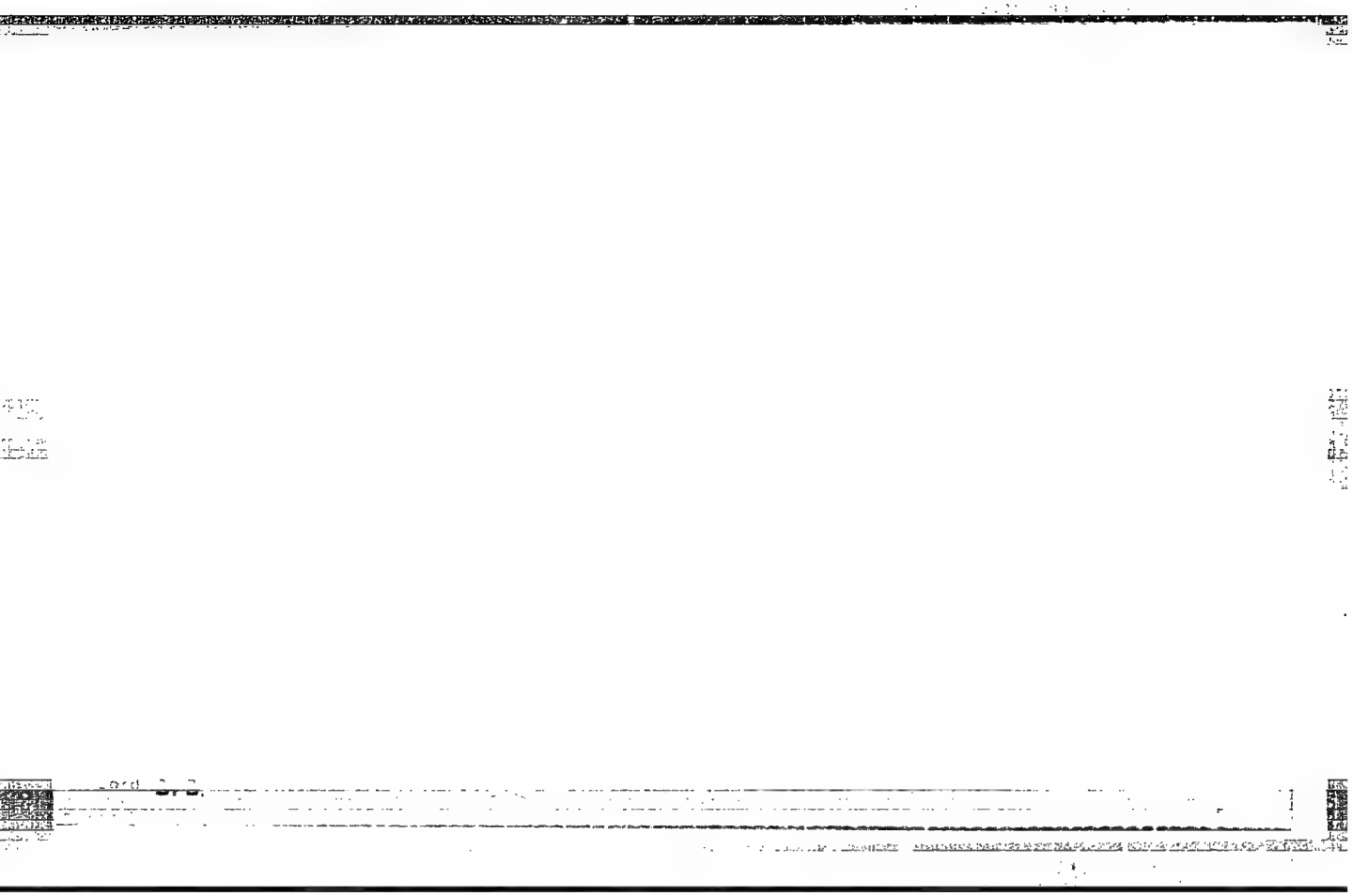

S/129/61/000/002/003/014
E193/E483

AUTHORS: Ul'yanova, N.V., Candidate of Technical Sciences and Teplov, V.S., Engineer

TITLE: Structural Transformations in Steels 12Kh1MF (12Kh1MF) and 15Kh1M1F (15Kh1M1F)

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov, 1961, No.2, pp.16-21

TEXT: The object of the present investigation was to study structural transformations in two heat-resistant steels used in the manufacture of tubes for heavy-duty steam conduits and steam superheaters. Steel 12Kh1MF contained 0.15% C, 0.26% Si, 0.7% Mn, 0.3% Mo, 1.0% Cr and 0.28% V, the chemical analysis of steel 15Kh1M1F being: 0.14% C, 0.3% Si, 0.85% Mn, 1.2% Mo, 1.1% Cr and 0.25% V. The critical points determined by the dilatometric method, were Ac_1 = 790°C and Ac_3 = 935°C for steel 12Kh1MF, the corresponding temperatures for steel 15Kh1M1F being 795 and 930°C. The isothermal decomposition of austenite was studied with the aid of the Akulov anisometer; the austenizing temperature of 970°C was employed and the time of isothermal treatment, at temperatures between 440 and 700°C, did not exceed 2 h. The

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Structural Transformations in Steels 12Kh1MF (12Kh1MF) and 15Kh1M1F (15Kh1M1F)

T.T.T. curves, obtained for steels 12Kh1MF and 15Kh1M1F, are reproduced in Fig.1 and 2 respectively. The constitution of steels after various heat treatments was determined by chemical and X-ray analysis of residues left after anodic dissolution of specimens studied. A technique, recommended by Popova (Ref.1), was used for this purpose. The results of the isothermal studies indicated that, depending on the degree of under-cooling of austenite, the structure of steel may consist of spheroidal or lamellar ferrite, products of the intermediate transformation, austenite and (at high rate of cooling) martensite. Under conditions of low degree of under-cooling, lamellar pearlite is formed in steel 12Kh1MF; the formation of pearlite in steel 15Kh1M1F is inhibited. In the next stage of the investigation, the effect of annealing (1 h at 970°C, followed by cooling to room temperature at 30°C/h) and normalizing (1 h at 970°C or 1050°C) with subsequent tempering at 600 to 750°C, was studied. Annealed steel 12Kh1MF consisted of ferrite and pearlite, its Brinnel hardness number being 120; it

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Structural Transformations in Steels 12Х1МФ (12Kh1MF) and 15Х1М1Ф (15Kh1M1F)

contained 2 carbides: Fe_3C and VC. In the case of steel 15Kh1M1F, the decomposition of austenite in the pearlitic range takes place so slowly that even at the rate of cooling of 30°C/h, a considerable proportion of austenite undergoes the intermediate transformation, whose products are tempered during subsequent cooling, so that the final annealed structure of this steel consists of ferrite and finely dispersed carbides Fe_3C, VC and Mo_2C; the Brinell hardness number of steel in this condition is 190. The structure of normalized steels consisted of ferrite and a pseudo-eutectic component, constituting a mixture of ferrite, austenite and a small proportion of fine carbide particles. (Editor's comment: The present author uses the term "normalizing" to describe treatment which is normally referred to as "air hardening"). The effect of tempering on the properties of "normalized" steels is illustrated in Fig.5 (steel 12Kh1MF) and Fig.6 (steel 15Kh1M1F), where Brinell hardness number is plotted against time (h) of tempering at temperatures indicated by each

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Structural Transformations in Steels 12X1MΦ (12Kh1MF) and 15X1M1Φ (15Kh1M1F)

curve; continuous and broken curves relate to specimens "normalized" at 970 and 1050°C, respectively. It will be seen that raising the "normalizing" temperature from 970 to 1050°C brings about an increase in hardness not only after this treatment but also after subsequent tempering. The former effect can be attributed to a decrease in the proportion of ferrite and to a high degree of dispersion of the transformation products, the latter effect being probably due to more uniform distribution of the alloying elements. In both steels, the effect of "secondary hardness" was observed during tempering. In the course of tempering, the "normalized" steels pass through a series of metastable states which differ one from another in the type and degree of dispersion of carbides and in the alloying additions' content in the ferrite matrix. The effect of various heat treatments on the constituents of the steels studied is illustrated by the results of analysis of the anodic residues of various specimens. These results are tabulated. Molybdenum represents

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Structural Transformations in Steels 12X1MΦ (12Kh1MF) and 15X1M1Φ (15Kh1M1F)

the main strengthening element of the α-solid solution. Mo_2C formed in steel 15Kh1M1F (see the table) combines 50% of the total quantity of molybdenum present in the steel, which indicates that the relative proportion of the alloying elements in the steel is far from optimum. There are 9 figures, 1 table and 2 Soviet references.

ASSOCIATION: MVTU imeni Baumana

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Structural Transformations in Steels 12X1MΦ (12Kh1MF) and 15X1M1Φ (15Kh1M1F)

Table. Legend:

(1) Steel code
(2) Annealing at 970°C, cooling to room temperature at 30°C/h
(3) "Normalizing" at 970°C, followed by tempering as shown below
(4) No tempering
(5) 3 h at 680°C
(6) 12 h at 680°C
(7) 25 h at 680°C
(8) 3 h at 740°C
(9) 12 h at 740°C
(10) 25 h at 740°C
(11) Austenite
(12) Austenite + Fe_3C + VC

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Structural Transformations in Steels 12X1MΦ (12Kh1MF) and 15X1M1Φ (15Kh1M1F)

Table

20

Фазовый состав электролитически выделенных осадков

Марка стали	Отжиг при 970°, охлаждение со скоростью 30 град/сек	Нормализация при 970° и отпуск по режимам						
		без отпуска	680°, 3 часа	650°, 12 час.	680°, 25 час.	740°, 3 часа	740°, 12 час.	740°, 25 час.
12X1MΦ	Fe_3C+ +VC	Аустенит	—	—	Аустенит+ +Fe_3C+VC (линии VC сильно размыты)	—	—	Fe_3C+ +VC+ +Cr_7C_3
15X1M1Φ	Fe_3C+ +VC+ +Mo_2C	Аустенит	Аустенит+ +Fe_3C+VC (линии VC сильно размыты)	Fe_3C+ +VC+ +Mo_2C	Fe_3C+ +VC+ +Mo_2C	Fe_3C+ +VC+ +Mo_2C	$Me_{23}C_6$+ +VC+ +Mo_2C	$Me_{23}C_6$+ +VC+ +Mo_2C

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E193/E483

Structural Transformations in Steels 12X1MΦ (12Kh1MF) and 15X1M1Φ (15Kh1M1F)

Fig. 1.

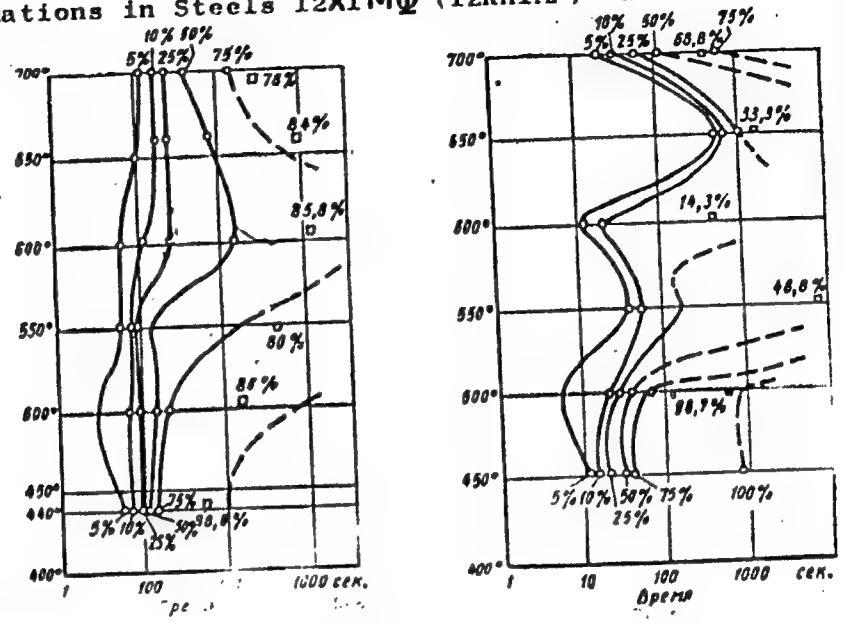

Fig. 2.

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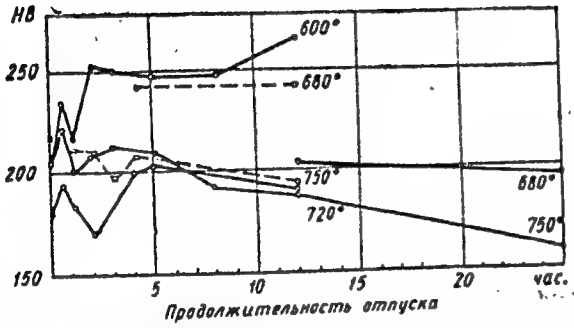
E193/E483

Structural Transformations in Steels 12X1M1Ф (12Kh1MF) and 15X1M1Ф (15Kh1M1F)



Фиг. 6. Изменение твердости при отпуске нормализованной стали 15X1M1Ф:

Fig.5.

Фиг. 5. Изменение твердости при отпуске нормализованной стали 12X1MФ:

Fig.6.

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TSAPLIN, V.A.; BATSIYEVSKIY, A.F.; TEPLOV, V.S., inzh., retsenzent; STROGANOV, L.P., inzh., red.

[Equipment for the measurement of metal hardness] Pribory dlia izmereniia tverdosti metallov. Moskva, Izd-vo "Mashinostroenie," 1964. 90 p. (MIRA 17:6)

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APPROVED FOR RELEASE: 07/16/2001 CIA-RDP86-00513R001755310020-7"

ACC NR: AP6003311 (N) SOURCE CODE: UR/0129/66/000/001/0052/0057

AUTHOR: Teplov, V. S.; Ul'yanova, N. V.

ORG: MVTU im. Baumana

TITLE: Structure, phase composition and mechanical properties of 12Kh2MFSR low-alloy steel

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 1, 1966, 52-57

TOPIC TAGS: low alloy steel, metal grain structure, phase composition, solid mechanical property, carbide phase, tempering / 12Kh2MFSR low-alloy steel

ABSTRACT: 12Kh2MFSR low-alloy steel (0.11% C, 1.78% Cr, 0.55% Mo, 0.25% V, 0.45% Si, 0.005% B, 0.18% Ni, 0.15% Cu, 0.52% Mn, 0.010% P, 0.012% S) is used to manufacture the superheater and steam-line tubes of boilers with high and superhigh parameters where the permissible temperature for the metal reaches 620°C. Studies of the isothermal transformation of this steel show that it is a bainitic-class steel, because, when continuously cooled from austenitic state, it forms a structure consisting of excess ferrite; a ferritic-pearlitic structure will not form under these conditions, since decomposition in the pearlitic region culminates in the formation of proeutectoid ferrite alone. The equilibrium carbide phases in this steel are VC and M_7C_3. The increase in normalizing temperature from 980 to 1080°C affects insignificantly the

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hardness, tensile strength and impact of the steel. On the other hand, the increase in this temperature to 1130°C reduces the steel's plasticity and broadens the scatter of the values of impact strength. Tempering at temperatures of up to 650°C inclusively for up to 25 hr is not sufficient to cause the formation of equilibrium carbide phases. Tempering at 700-780°C assures the formation of these phases, and then the strength is determined by structural factors -- the size and shape of ferrite grains as well as the pattern of distribution of the carbides. These special cabides, particularly vanadium carbide VC, inhibit the process of ferrite recrystallization, which is bound to enhance the high-temperature strength of the steel compared with regimes leading to partial or complete recrystallization of the ferrite. Orig. art. has: 4 figures, 1 table.

SUB CODE: 11, 13, 20/ SUBM DATE: none/ ORIG REF: 001/ OTH REF: 002

Card 2/2 SLV

KISLITSYN, V.G.; TEPLOV, V.V.

Using small molds in the autoclave production of wall slabs. Bet. i zhel.-bet. 9 no.3:140-142 Mr '63. (MIRA 16:4)

1. Glavnyy konstruktor Sverdlovskogo zavoda zhelezobetonnykh izdeliy imeni Leninskogo komsomola (for Kislitsyn).
2. Vedushchiy konstruktor Proyektno-konstruktorskoy kontory Glavstroydetali Ministerstva stroitel'stva predpriyatiy metallurgicheskoy i khimicheskoy promyshlennosti SSSR (for Teplov).

(Autoclaves) (Precast concrete—Curing)

TEPLOV, Ye. A.

64339

24(6) 24.7700 SOV/181-1-10-14/21

AUTHORS: Aleksandrov, V. V., Pruzhinina, V. I., Rekov, A. I., Tarakanova, T. S., Teplov, Ye. A.

TITLE: Some Electric Properties of Boron-Silicon Carbides

PERIODICAL: Fizika tverdogo tela, 1959, Vol 1, Nr 10, pp 1587 - 1591 (USSR)

ABSTRACT: Boron-silicon carbides (BSC) were burned in furnaces at ~2000°C. End product: approximately 50-70 kg. Sample Nr 1, BSC-1 (composition: B_2SiC), is likely to be produced according to the reaction equation $2H_3BO_3+SiO_2+6C=B_2SiC+3H_2O+5CO$, while BSC-2 (composition: $B_4C \cdot 2SiC=B_4Si_2C_3$) is probably formed according to the reaction equation $4H_3BO_3+2SiO_2+13C=$ $=B_4Si_2C_3+6H_2O+10CO$. Results of chemical analysis of the two druse-shaped samples are given in table 1. For results of electric measurements see figure 1 (dynamic volt-ampère characteristics of BSC-1, BSC-2 and Si(samples), figure 2 (volt-ampère characteristics of BSC-1, BSC-2 and SiC samples) and figure 3 (dependence of voltage on temperature of BSC-1,

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BSC-2 and SiC samples at constant current). Analysis of the results permits the following conclusions: 1) The nonlinearity of BSC used in engineering is interior to that of SiC applied in electrical engineering. 2) The resistivity of the barrier layer of BSC is lower than that of the corresponding SiC layer, while the resistivity of thick BSC crystals exceeds that of thick SiC samples. The high resistivity of thick BSC grains allows to produce high-resistance volume resistors from them. They are virtually linear and may have great or small temperature coefficients. Results of measurement concerning the electric properties of BSC resistors will later be published. There are 3 figures, 2 tables, and 6 references, 4 of which are Soviet.

SUBMITTED: February 10, 1959

Card 2/2

TEPLOV, Yu.A. (Kazan')

Combined flow of oil and bottom water toward a well. Izv.AN SSSR. Otd.tekh.nauk.Mekh.i mashinostr. no.5:197-200 S-O '60. (MIRA 13:9)
(Oil reservoir engineering)

TEPLOV, Yu.A. (Kazan')

Combined flow of oil and bottom water toward a well in a nonuniform bed. Izv.AN SSSR.Otd.tekh.nauk.Mekh.i mashinostr. no.2:124-129 Mr-Ap '61. (MIRA 14:4)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.
(Oil reservoir engineering)

DANILOV, V.L.; TEPLOV, Yu.A.

Modeling the contraction of an oil-water boundary on a slotted tray. Izv. Kazan. fil. AN SSSR. Ser. fiz.-mat. i tekh. nauk. no. 15:33-44 '62. (MIRA 17:7)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.

TEPLOV, Yu.A.

Relation of the oil and water output with their simultaneous inflow to a well in a fragment-uniform reservoir with bottom water. Izv. Kazan. fil. AN SSSR. Ser. fiz.-mat. i tekh. nauk no. 15:67-78 '62.

Output of water-free oil flowing into a well in a nonuniform reservoir with bottom water and top gas. Ibid.:79-85
(MIRA 17:7)

1. Fiziko-tekhnicheskiy institut Kazanskogo filiala AN SSSR.

TEPLOVA, A.P.;TUCHKEVICH, V.M.;UVAROV, A.I.

Measurement of the active and reactive components of the input resistance of a crystal amplifier by the method of varying the resistance of a generator. Zhur.tekh.fiz. 25 no.12:2112-2118 O '55. (MLRA 9:1)

(Transistors) (Electronic measurements)

S/0120/64/000/002/0084/0087

ACCESSION NR: AP4033115

AUTHOR: Teplova, A. P.

TITLE: Selective amplifier of weak signals

SOURCE: Pribory* i tekhnika eksperimenta, no. 2, 1964, 84-87

TOPIC TAGS: amplifier, radiation signal amplifier, weak signal amplifier, low noise amplifier, 0.6 cps amplifier, narrow band amplifier, dc amplifier

ABSTRACT: A device for amplifying weak electric signals from photovaristors, thermocouples, optic-acoustic receivers, etc. is described. The low-noise amplifier was designed with optimum operating mode of the input stage and a narrow passband. A steady-state radiation flux to be measured is chopped to a 10-cps signal prior to energizing the radiation pickup. Vane 2 (see Fig. 1 of Enclosure) fastened to the armature of polarized relay 1 serves as a modulator. The alternating radiation flux is then applied to pickup 3, a-c amplifier 4, and synchronous detector 6. Low-frequency generator 5 develops a reference voltage for 6 in phase with that applied to the modulator. Oscillograph 7 is used to check the phase shift between the signal and the reference voltages. After de-

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tection, the signal is fed to recording potentiometer 8. Test results: noise power at input at 10 cps, passband 0.6 cps, on 10 ohms is 2.5×10^{-18} w; same on 2.0 Mohm is 10^{-20} w; noise voltages referred to the input are 5×10^{-9} v and 1.4×10^{-7} v, respectively. "The author takes this opportunity to thank N.S. Yakovchuk and G.V. Khozov for help rendered in the course of the project." Orig. art. has: 2 figures and 2 formulas.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN SSSR (Physicotechnical Institute, AN SSSR)

SUBMITTED: 20Jan63 ENCL: 01 SUB CODE: EC

NO REF SOV: 005 OTHER: 002

Card 2/3

ACCESSION NR: AP4033115

ENCLOSURE: 01

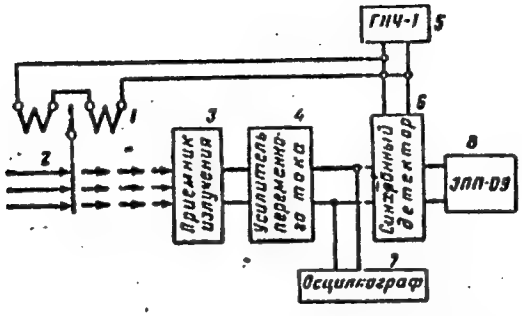

Fig. 1. Amplifier of weak radiation signals

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Teplova, G.N.

SHAFER, I.I.(Leningrad); PETUSHINOV, M.A. (Leningrad); TEPLOVA, G.N. (Leningrad)

First Conference of Surgeons of the R.S.F.S.R. in Kuybyshev, held on July 3-6, 1956. Vest.khir. 78 no.2:149-153 F '57. (MIRA 10:3)
(SURGERY)

TEPLOVA, G.N. (Leningrad, P-46, ul. Kuybysheva, d.3, kv. 7)

Peripheral blood picture in various forms of acute appendicitis.
Nov. khir. arkh. no.2:93-96 Mr-Ap '59. (MIRA 12:7)

1. Kafedra fakul'tetskoy khirurgii (zav. - prof. P.N. Napalkov) Leningradskogo sanitarno-gigiyenicheskogo meditsinskogo instituta.
(APPENDICITIS) (LEUCOCYTES)

Izbiratel'naya Sistema Yevropeyskikh Stran Narodnoy Demokratii
(The Electoral System of the European Countries of the People's Democracies)
Moskva, Gosyurizdat, 1956.
60, (1) P. (Nauchno-Popularnaya Yuri-di-cheskaya Literatura)
"Bibliografiya": P. 60-(61)

KNORRE, D.G.; TIPLOVA, N.M.; SHISHINA, T.N.

Nature of the labile product of reaction of water-soluble carbodiimide with formylglycine. Izv. SO AN SSSR no.1 Ser. khim. nauk no.1:149-151 '65. (MIRA 18:8)

1. Novosibirskiy institut organicheskoy khimii Sibirskogo otdeleniya AN SSSR.

SERIKOV, N.F. kand.tekhn.nauk; TEPLOVA, O.N., inzh.

Standard designs for neutralization units at plants of ferrous metallurgy. Vod. i san. tekh.no.5:19-22 '64. (MIRA 17:9)

NIKIFOROVA, V.N.; TEPLOVA, R.V.; ZOBOVA, R.G.; LYADOVA, G.A.

[Chemical and physical characteristics of "Iris" toffee and hard candy filling] Khimicheskie i fizicheskie kharakteristiki irisa i nachinok karameli. Moskva, TSentr. in-t nauchno-tekhn. informatsii pishchevoi promyshl., 1964. 26 p. (MIRA 18:4)

NIKISHOV, M.I., kandidat geograficheskikh nauk; TEPLOVA, S.N., redaktor; LIPSHITS, N.I., tekhnicheskiy redaktor; SIMONOVSKIY, A.Ya, tekhnicheskiy redaktor.

[Geografical atlas of foreign countries; for class 9 of secondary schools] Geograficheskii atlas zarubezhnykh stran; dlia 9-go klassa srednei shkoly. Moskva, Glavnoe upravlenie geodezii i kartografii MVD SSSR, 1955. 79 p. (Atlases) (MLRA 9:5)

SHAFEROVA, K.A.; SHEPELENKO, T.A.; TEPLOVA, S.V.

Distribution of pathogenic serotypes of Escherichia coli in a rural locality. Zdrav. Turk. 7 no.11:26-28 N'63 (MIRA 17:3)

UL'YANOVA, N.V.; TEPLOV, V.S.

Changes in the structure of heat resistant steels during extended holding at 600°C. Metalloved. i term.obr.met. no.1:18-25 Ja '65. (MIRA 18:3)

1. Moskovskoye vyssheye tekhnicheskoye uchilishche im. Baumana.

KNORRE, D.G.; PUSTOSHILOVA, N.M.; TEPLOVA, N.M.; SHAMOVSKIY, G.G.

Production of transfer RNA acetylated by 2'-oxy groups.
Biokhimiia 30 no.6:1218-1224 N-D '65. (MIRA 19:1)

1. Institut organicheskoy khimii Sibirskogo otdeleniya AN SSSR, Novosibirsk. Submitted March 15, 1965.

TEPLOVA, V.P.; KOSTENKO, V.G.

Separation of protein from a Penicillium chrisogenum micelle and study of its amino acid composition. Uch. zap. Mord. gos. un. no.27:32-35 '63. (MIRA 19:1)

TEPLOVA, Ya. A.

56-5-4/55

AUTHOR NIKOLAYEV, V. S., FATEYEVA, L.N., DMITRIYEV, I.S., TEPLOVA, Ya.A.

TITLE Distribution of the Equilibium of the Charge of Nitrogen Ions (Ravnovesnoye raspredeleniye zaryadov ionov azota. Russian)

PERIODICAL Zhurn. Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 5, pp 965-968 (U.S.S.R)

ABSTRACT $14_N{}^{+2}$, $14_N{}^{+3}$, and $14_N{}^{+4}$ -ions are accelerated up to 0,95 to 9,4 MeV in a 72 cm cyclotron. The focussed beam penetrated a target at about 8 m distance from the cyclotron and was then deflected in a horizontal direction by a magnet. The targets consisted of a celluloid foil(~10 $\mu g/cm^2$) on to which in the vacuum beryllium (~ 10 $\mu g/cm^2$), nickel (~ 10 $\mu g/cm^2$), and gold (15 - 30 $\mu g/cm^2$) was vaporized.

The recording device consisted of proportionality counter tubes arranged one behind the other, which had an input surface of 110 x 0,1 mm^2 and were closed by cellophane (~70 $\mu g/cm^2$). In the first counter all ions and in the second only ions with a certain charge were measured. The dependence of the average charge on the velocity of ions is graphically recorded.

A slight difference in the charge distribution of the ions after their passage through the above mentioned materials was found.

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56-5-4/55

Distribution of the Equilibrium of the Charge of Nitrogen Ions

ASSOCIATION Not given
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TEPLOVA, Ya. A.

56-5-6/55

AUTHOR: TEPLOVA, Ya.A., DMITRIYEV, I.S., NIKOLAYEV, V.S., FATEYEVA, L.N.

TITLE: On the Interaction of Lithium Ions with Matter. (O vzaimodeystvii ionov litiya s veshchestvom, Russian)

PERIODICAL: Zhurnal Eksperim. i Teoret. Fiziki, 1957, Vol 32, Nr 5, pp 974 - 978 (U.S.S.R.)

ABSTRACT: In a 72 - cm cyclotron Li^7 ions were accelerated to 0,5 to 5 MeV and their specific ionization in air and hydrogen, the equilibrium distribution of charge after passage through celluloid and their ranges in hydrogen, air, and in the photoemulsion NIKFI-YA-2 were determined. From the curves of the energy loss of the Li^7 ions in air (expressed in MeV per 1 cm path) a maximum at about 7.10^8 cm/sec ion velocity can be observed, whereas for hydrogen a broad maximum between 4 and 8.10^8 cm/sec ion velocity is to be noticed.

As a result of the charge equilibrium distribution of the Li^7 ions, after they had entered into interaction with a celluloid foil of $\sim 20\ \mu g/cm^2$ thickness, the corresponding curves for 4 different charge states are given

The range curves of the Li^7 ions in the emulsion NIKFI-YA-2 are compared with those of other photoemulsions.

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56-5-6/55

On the Interaction of Lithium Ions with Matter.

ASSOCIATION: Not given
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AVAILABLE: Library of Congress

Card 2/2

TEPLOVA, Ya. A.

NIKOLAYEV, B.S.; FATEYEVA, L.N.; DMITRIYEV, I.S.; TEPLOVA, Ya.A.

Overcharge cross section of nitrogen ions in gases. Zhur. eksp. i teor. fiz. 33 no.1:306-307 Jl '57. (MLRA 10:9)

1. Moskovskiy gosudarstvennyy universitet.
(Nitrogen) (Ions)

TEPLOVA, Ya. A.

56-6-3/47

AUTHORS: Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N., Teplova, Ya. A.

TITLE: The Equilibrium Distribution of Charges in a Beam of Ions of Light Elements (Ravnovesnoye raspredeleniye zaryadov v puchke ionov legkikh elementov)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskiy Fiziki, 1957, Vol. 33, Nr 6(12), pp. 1325-1334 (USSR)

ABSTRACT: The present paper determines the equilibrium distribution of the charges of the ions of light elements with nuclear charge numbers Z from 5 to 10 after their passage through hydrogen, air, argon, and through a celloid film. These ions had velocities of from 3,5 to 11,10^8 cm/sec, i.e. $v \sim 1,5 - 5\ v_0$, where it holds that $v_0 = e^2/\hbar$.

As a source of the fast particles a 72 cm cyclotron was used, by means of which the following ions were accelerated:

$^{11}B^{+1,+2,+3}$; $^{13}C^{+2,+3}$; $^{14}N^{+2,+3}$; $^{16}O^{+2,+3}$

and $^{20}Ne^{+2,+3}$. The ion beam emerging from the cyclotron was deflected by a magnetic field after which it entered a

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The Equilibrium Distribution of Charges in a Beam of Ions of Light Elements

re-charge chamber. The particles which passed through the chamber were analyzed by means of a magnet and were recorded by means of counters. The results of these measurements are illustrated by means of three diagrams. The distribution of charges in an ion beam in general differs after the passage through the various substances. Attention is also caused by the different character of the dependence of the ratio of the relative intensities Φ_{i+1}/Φ_i upon the velocity of the substance when passing through solid and gaseous matter. (Here i denotes matter) During the passage of ions through different media the following peculiarities may be observed in the behavior of the degree of ionization $\bar{i}/Z$. At $0,2 \leq \bar{i} \leq 0,6$ the average charge in argon is in all investigated ions larger than the average charge in hydrogen (by about 10-20 %). The average charge in depends less on velocity than the average charge in air and argon. The average charge of the ions is, after having passed through a celluloid film, greater within a wide range of velocity than the average charge of ions in gases. With increasing nuclear charge number of the ions the average

56-6-3/47

The Equilibrium Distribution of Charges in a Beam of Ions of Light Elements

charge of ions after passage through the film increases much more rapidly than the average charge in air. The degree of ionization of the ions investigated here in air, hydrogen, and argon in the domain $0,2 \lesssim I \lesssim 0,6$ can be represented for every gas by a special function of the parameter $v/v_0 Z^{\alpha}$ where $\alpha \sim 0,4$ holds in the case of all gases. In conclusion the authors discuss the here obtained results and compare them with those obtained by other authors. There are 7 figures, 2 tables, and 20 references, 7 of which are Slavic.

ASSOCIATION: Moscow State University (Moskovskiy gosudarstvennyy universitet)

SUBMITTED: June 28, 1957

AVAILABLE: Library of Congress

Card 3/3

TEPLOVA, Ya. A.

56-7-63/66

AUTHOR NIKOLAYEV, V.S., FATEYEVA, L.N., DMITRIYEV, I.S., TEPLOVA, Ya.A.

TITLE The Re-Charge Cross Section of Nitrogen Ions in Gases (Secheniya perezaryadki ionov azota v gazakh. Russian)

PERIODICAL Zhurnal Eksperim. i Teoret. Fiziki 1957, Vol 33, Nr 7, pp 306 - 307 (U.S.S.R.)

ABSTRACT N^{+2}, N^{+3}, N^{+4} - ions were accelerated to 1,3 - 9,7 MeV on a 72 cm cyclotron and the recharge cross section of these ions in nitrogen, argon, and hydrogen was measured. In form of curves the electron capture cross section and the electron loss cross section of N-ions in nitrogen is represented. The electron capture cross section for nitrogen and argon can be represented by

$$\sigma_{i,i-1} = 2\pi \cdot a_o^2 (v_o/v)^5 \, i^{5/2} \, Z^{1/2}$$

(i - charge, a_o, v_o = Bohr's radius and velocity of the electron in the hydrogen atom, Z - atomic number of the investigated gas). The electron loss cross section $\sigma_{i,i+1}$ is 2 - 2,5 times greater in argon, and 6 - 10 times smaller in hydrogen than that of nitrogen. (With 1 illustration and 4 Slavic references).

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The Re-Charge Cross Section of Nitrogen Ions in Gases

56-7-63/66

ASSOCIATION Moscow State University (Moskovskiy gosurdarstvennyy universitet)

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SUBMITTED 23.4.1957

AVAILABLE Library of Congress

Card 2/2

AUTHORS: Teplova, Ya. A., Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N. SOV/56-34-3-5/55

TITLE: Ranges and Specific Ionisation of Multi-Charged Ions in Gases (Probegi i udel'naya ionizatsiya mnogozaryadnykh ionov v gazakh)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol. 34, Nr 3, pp. 559-568 (USSR)

ABSTRACT: Measurements were made of the path length and the specific ionisation of the ions from Be to Ne at velocities of from 1,5.10⁸ to 12.10⁸ cm/sec in argon, air, and hydrogen. The authors start with the description of the experimental method, they here use a focused ion beam from a 72 cm cyclotron. The method of the measurement is based upon that the recorder of the charged particles, which was mounted on a movable bar, was moved on the trajectory of the beam inside the slowing down chamber to measure the relative ionisation along the beam. Also the slowing down of the ions in a gas filled chamber is described. The specific ionisation and the ranges of the ions with velocities of from 4.10⁸ to 12.10⁸ cm/sec were measured by means of a calibrated counter with a linear amplifier. The ranges of the nitrogen ions at velocities of from

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$1,5.10^8$ to 4.10^8 cm/sec were measured by means of a planar ionisation chamber. The next paragraph deals with the analysis of the results and with the experimental errors. The measurements furnished the dependence of the magnitude of the momenta (or of the ionisation current) on the distance between the counter and the spot where the beam entered the slowing down chamber. The results of the measurement of the ranges are illustrated in a diagram in form of the dependence of Z^2R/A on E/A, i. e. in units which do not depend on the isotopic mass of the ion A. The energy which has to be used up for the production of an ion pair does not depend, within the measuring error limits, on the velocity and on the shape of the ion A; that is to say, the shapes of the curves of the specific ionisation and of the mean energy loss dE/dx agree with each other. A comparison of the ranges of the ions in various gases shows the following: At the same velocity the range in argon is by 6% longer and in hydrogen 3,7 times as long as in air and this relation decreases somewhat with increasing Z of the ion. The specific ionisation at $v(5.10^8$ cm/sec is proportional to the velocity and it has a maximum at $v \sim 6 - 8.10^8$ cm/sec similar as in the Bragg curve for the α - particles. In the maximum $dE/dx \approx 1,5$ Z MeV/cm holds. For the transition from argon to air for all ions the coefficient 0.92 ± 0.05 can be used, and

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Ranges and Specific Ionisation of Multi-Charged Ions in Gases SOV/56-34-3-5/55

for the transition from hydrogen into air the coefficient 0.29 ± 0.01. The last paragraph gives a discussion of the results. The ranges of the ions in air, measured by means of a ionisation chamber are by about 1 mm shorter than the ranges measured by a counter. This can be explained qualitatively only by nuclear collisions. The slowing down power of the photoemulsion for the here examined ions in air resembles the slowing down power for α - particles. The results of the measuring of the specific losses in case of the ions ^{14}N agree with the data already known before within the experimental errors. But the here found data for the ions ^{20}Ne are by 30% higher than the values found before. This difference can hardly be explained by the influence or nuclear collisions.
There are 5 figures, 2 tables, and 26 references, 7 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet (Moscow State University)

SUBMITTED: September 2o, 1957.

Card 3/3

TEPLOVA, Ya. A.

PHASE I BOOK EXPLOITATION SOV/5553

Pebelintseva, G. M., ed.

Uskoriteli; sbornik statey (Accelerators; Collection of Articles) Moscow, Atomizdat, 1960. 121 p. Errata slip inserted. 5,000 copies printed.

Scientific Ed.: B.N. Yablokov; Ed.: G.M. Pebelintseva; Tech. Ed.: N.A. Vlasova.

PURPOSE: This collection of articles is intended for scientists and engineers engaged in the construction and operation of particle accelerators.

COVERAGE: These original articles treat specific problems arising in the operation of present-day accelerators, particularly linear electron accelerators. A new accelerator put into operation at the Ukrainskiy fiziko-tekhnicheskiy institut (Ukrainian Physicotechnical Institute) is described, and problems in the dynamics of particles in linear electron accelerators are discussed. New methods are discussed for the extraction of particles from accelerators. Problems associated with the shaping of permanent magnetic fields and the acceleration of multicharge ions are also treated. The changeover of the series cyclotron to the phasotron acceleration mode with a view to increasing the energy of accelerated particles is described, and some problems connected with the bunching of particles are elaborated. No personalities are mentioned. References accompany each article.

TABLE OF CONTENTS:

24 (7)

AUTHORS: Teplova, Ya. A., Nikolayev, V. S. Dmitriyev, I. S., Fateyeva, L. N.

SOV/48-23-7-23/31

TITLE: The Path Length and the Specific Ionization of Multiply Charged Ions (Probegi i udel'naya ionizatsiya mnogozaryadnykh ionov)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 7, pp 894-897 (USSR)

ABSTRACT: As the known experimental data on the stopping of multiply charged ions in a substance are considered insufficient by the authors, they carried out experiments with the ions ^{23}Na, ^{25}Mg, ^{27}Al, ^{31}P, ^{37}Cl, ^{40}Ar, ^{39}K, ^{81}Br and ^{84}Kr. A 72-centimeter cyclotron was used as ion source which delivers ions with the velocities of 2.5 to $12 \cdot 10^8$ cm/sec which corresponds to an energy of 25 to 600 kev. The particles were recorded by a twofold proportional counter, and details of the measuring methods are described. The measurements showed that the specific ionization is proportional to the path length, and the path length is proportional to the velocity of the particles if the latter does not exceed $5 \cdot 10^8$ cm/sec. Subsequently, the dependence of

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the path length at an air pressure of 760 mm Hg on the nuclear-charge number of the ions is investigated, and the results are represented in a diagram (Fig 3). The stopping power of air and celluloid in dependence on the nuclear-charge number of the ions was calculated for an ion velocity of $3.5 \cdot 10^8$ cm/sec, and the results are represented in the diagrams in figures 5 and 6. The data obtained in the experiments described are used for this calculation. Finally, the difference between the mean charge of ions in gases and in solid substances is investigated, and it is ascertained that the stopping power very much depends on the nuclear-charge number in solid substances. There are 6 figures and 6 references, 4 of which are Soviet.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of Moscow State University imeni M. V. Lomonosov)

83678

S/048/60/024/009/015/015
B003/B063

26.1420 (2117, 2217)

AUTHORS: Dmitriyev, I. S., Nikolayev, V. S., Fateyeva, L. N., Teplova, Ya. A.

TITLE: The Amount of the Mean Charge of Ions Passing Through a Substance

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1960, Vol. 24, No. 9, pp. 1169-1174

TEXT: The present paper describes an experimental study of the equilibrium charge distribution of ions of light elements ($2 \leq Z \leq 18$) and of Kr ions in helium, nitrogen, argon, krypton, and celluloid foil. Besides, the authors measured the charge exchange cross sections of these ions in gases. A 72-cm cyclotron (Ref. 3) served as the source of fast, multiply charged ions. The experimental arrangement is shown in Fig. 1. The equilibrium charge distribution of the ions with $Z \leq 10$ was measured in the velocity range of $(2.6 \div 12).10^8$ cm sec^{-1}. In this velocity range and for the above-mentioned substances, the width of distribution σ is nearly equal for each ion. The dependence of the degree of ionization $\bar{i}/Z$ on the ion

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The Amount of the Mean Charge of Ions Passing Through a Substance

velocity differs in the various media (Fig. 2). The monotonous course of $\bar{i}/Z$ is a matter of fact within one period of Mendeleyev's periodic table. As it seemed to be unjustified to extend this dependence to a wider range of variations of Z, the equilibrium charge distribution of the ions with $Z > 10$ in the above-mentioned substances was measured at velocities of $2.6.10^8$ and $4.1.10^8$ cm sec^{-1}. It was found that at these ion velocities the mean charge $\bar{i}$ increases with increasing Z in all substances. The Z-dependence of the degree of ionization $\bar{i}/Z$ shows different characters in gases and solids. Fig. 3 shows the dependence of $\bar{i}/Z$ on Z in helium (I) and celluloid foil (II) for $v = 2.6.10^8$ cm sec^{-1} (a) and $v = 4.1.10^8$ cm sec^{-1} (b). Fig. 4 shows the dependence of $\bar{i}^2$ on Z in nitrogen (1) and celluloid foil (2) for $v = 2.6.10^8$ cm sec^{-1} (a) and $v = 4.1.10^8$ cm sec^{-1} (b). Fig. 5 shows the dependence of ϕ_i on Z and Fig. 6 the dependence of the width of the equilibrium charge distribution $\sigma = \sqrt{\bar{i}^2 - \bar{i}^2}$ on Z. The perturbation of the continuity of $\bar{i}$ and ϕ_i as a function of Z is due to the fact that

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the filling of the third electron shell begins in the range Z = 11 ... 13. The equilibrium charge distribution of the ion beam depends on the cross sections of the electron loss (Q_n) and capture ($Q_з$). The measurement of these cross sections shows that the dependence of Q_n and $Q_з$ on Z of the ions does not take a monotonic course (Fig. 7). The results obtained prove that it is necessary to take into account the effect of the periodic structure of the electron shell of the ions upon the amounts of $\bar{i}$ and $\bar{i}^2$. There are 7 figures and 5 Soviet references.

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of Moscow State University imeni M. V. Lomonosov)

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S/056/60/039/004/001/048
B004/B070

24.2100 - 1043, 1482 only
26.2310

AUTHORS: Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N., Teplova, Ya. A.

TITLE: Investigation of the Equilibrium Charge Distribution in a Beam of Fast Ions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960, Vol. 39, No. 4(10), pp. 905-914

TEXT: This is in continuation of an earlier work of the authors (Ref. 1) in which they studied the equilibrium charge distribution in a beam of ions of light elements (Z = 5 to Z = 10) and found a monotone dependence of the average charge $\bar{i}$ on Z. The purpose of the present work was to study the function $\bar{i} = f(Z)$ at the transition from one period of the periodic system to another. For this purpose, the equilibrium distribution of ions of He, Li, B, N, Ne, Na, Mg, Al, P, Ar, and Kr in helium, nitrogen, argon, krypton and in a celluloid film was measured. The measurements for He, B, N, and Ne were made in a larger range of

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velocities than in Ref. 1. For ions with $Z > 10$, the measurements were made only at $v = 2.6 \cdot 10^8$ cm/sec; for Na, P, and Ar the measurements were also made at $4.1 \cdot 10^8$ cm/sec. The multi-charge ions were accelerated in a 72-cm cyclotron. Ions of charges $i \pm 1$, $i \pm 2$, etc. were obtained from those of the initial charge i by passing them through a celluloid film of approximate thickness 2 $\mu g/cm^2$. The data for the equilibrium distribution of ions with $Z < 10$ are given in Tables 1-3, and in Fig. 1. In all mediums, the distribution was nearly Gaussian:

$\Phi_i \approx (1/\sigma\sqrt{2\pi}) \exp\left[-(i - \bar{I})^2/2\sigma^2\right]$. The curve is characterized by two parameters: the average charge $\bar{I} = \sum_i \Phi_i i$ and the width of the distribution $\sigma = \left[\sum_i \Phi_i (i - \bar{I})^2\right]^{1/2}$. For He, Li, B, N, and Ne, σ was again found to increase monotonically with increasing Z. $\bar{I}$ was found to be different in the different media (Fig. 2). The following rule was found to hold for all ions: maximum value of $\bar{I}$ in nitrogen and argon,

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$\bar{I}_{He} < \bar{I}_{N}$; $\bar{I}_{Kr} < \bar{I}_{Ar}$. The authors note that the dependence of $\bar{I}$ on the atomic weight Z_m in gases does not fit the theoretical estimates made in Refs. 14 - 16 on the basis of the statistical model of the atom. The data for the equilibrium distribution of $Z > 10$ ions are given in Figs. 3 and 4. For the same velocities, the dependence of $\bar{I}$ on the medium was about the same as for $Z \leq 10$. However, the difference between $\bar{I}$ in gases and in celluloid film increases very much for $Z > 10$. The maximum of this difference for light ions is 15%, while for Ne it is about 50%, for Na, Mg, and Al about 60%, for P about 80%, and for Kr about 130%. For a given velocity, $\bar{I}$ increases with Z in all media. In contrast thereto, the degree of ionization $\bar{I}/Z$ decreases monotonically in gases (Fig. 5). Around Z = 10, however, the decrease in the degree of ionization becomes slower, and for solid media even an increase takes place. Still more noticeable is the perturbation in the continuity of the function $\Phi_i = f(Z)$ (Fig. 3). For Z = 12, Φ_o and Φ_i show clear minima. In this range of Z, the width σ of the equilibrium distribution also becomes less (Fig. 6). This discontinuity in the dependence of Φ_i, i, and σ on Z

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Investigation of the Equilibrium Charge Distribution in a Beam of Fast Ions

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observed in the range $Z \sim 10 - 12$ is explained as being due to the beginning of the filling of a new electron shell. There are 6 figures, 3 tables, and 18 references: 7 Soviet, 7 US, 2 British, and 2 Danish.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of the Moscow State University)

SUBMITTED: April 13, 1960

Card 4/4

NIKOLAYEV, V.S.; DMITRIYEV, I.S.; FATEYEVA, L.N.; TEPLOVA, Ya.A.

Experimental study of electron capture by multiply charged ions. Zhur. eksp. i teor. fiz. 40 no.4:989-1000 Ap '61. (MIRA 14:7)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Electrons--Capture) (Ions) (Cyclotron)

NIKOLAYEV, V.S.; FATEYEVA, L.N.; DMITRIYEV, I.S.; TEPLOVA, Ya.A.

Capture of several electrons by fast multicharge ions. Zhur.eksp.i teor.fiz. 41 no.1:89-99 Jl '61. (MIRA 14:7)

1. Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta.
(Electrons—Capture) (Ion beams)

TEPLOV, I.B.; DMITRIYEV, I.S.; TEPLOVA, Ya.A.; SHEVCHENKO, O.P.

Study of excited states of Be^8 with the aid of the reaction $Li^7(p,\alpha)He^4$. Izv. AN SSSR. Ser. fiz. 26 no.9:1150-1153 S '62. (MIRA 15:9)

(Nuclear reactions) (Beryllium—Isotopes)

S/048/62/026/011/018/021
B125/B102

AUTHORS: Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N., and Teplova, Ya. A.

TITLE: Charge exchange of various ions in their interaction with residual gas

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 11, 1962, 1430-1434

TEXT: The charge distribution in ion beams was measured after their passage through the experimental setup used for determining the cross sections of electron loss and capture by ions with $2 \leq Z \leq 18$. This setup contains only the residual gas of $(1.2\text{-}1.5)\cdot10^{-5}$ mm Hg. For ions with $Z \leq 10$ the measurements were made at energies of 35-350 kev per nucleon and ion velocities of $2.6\cdot10^8$ to $8\cdot10^8$ cm/sec, for $Z > 10$ at $v = 2.6\cdot10^8$ cm/sec, and for phosphorus and argon ions at $v = 4.1\cdot10^8$ cm/sec. These ions (charge i) were accelerated in a 72-cm cyclotron and passed through a charge exchange chamber, then recorded by a system of eight proportional counters. This apparatus was evacuated by oil vapor diffusion pumps. The ion beam that had passed through the setup always contained ions with

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final charges $k \neq i$ besides ions with the initial charge i. Fig. 2 shows typical distributions of charges in the ion beam. The ion charges are evidently changed by one interaction with the residual gas molecules. $\bar{\Phi}_{ik} = n\sigma_{ik}$ holds for $k \neq i$, where σ_{ik} is the mean charge exchange cross section (from charge i to k). n is the mean number of molecules in the volume: unit cross section·path of the ion; $\bar{\Phi}_{ik}$ is the relative number of ions with charge k. Notwithstanding the presence of oil vapor, the experimental values of $\bar{\Phi}_{ik}$ in the residual gas nearly always agree with the values of $\bar{\Phi}_{ik}$ in nitrogen, except the values of $\bar{\Phi}_{10}$ which are much higher for ions with $Z \sim 11$-12 than for nitrogen ions. Therefore the minimum of the function $\bar{\Phi}_{10}(Z)$ is less deep than for nitrogen. This minimum is still less deep for the residual gas than for krypton. If the ion beam passes through a celluloid film, the values of $\bar{\Phi}_{i,i+1}$ mostly exceed the theoretical values. This suggests the presence of excited ions with lifetimes of $\sim 10^{-7}$ sec in the ion beam. There are 4 figures.

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Charge exchange of various ...

ASSOCIATION: Nauchno-issledovatel'skiy institut yadernoy fiziki Moskovskogo gos. universiteta im. M. V. Lomonosova (Scientific Research Institute of Nuclear Physics of the Moscow State University imeni M. V. Lomonosov)

Fig. 2. The values of Ξ_{ik} for phosphorus ions after their passage through the residual gas (1) and nitrogen (2) at the ion velocity $v = 2.6 \cdot 10^8$ cm sec^{-1}, ion energy E≈1.1 Mev.

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24.6712

AUTHORS: Dmitriyev, I. S., Nikolayev, V. S., Fateyeva, L. N., Teplova, Ya. A.

TITLE: Experimental study of electron losses by multiply charged ions in gases

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 1, 1962, 16 - 26

TEXT: The cross sections $q_{i,i+1}$ of collisions with loss of an electron of 1-6-fold charged ions of light elements (Z = 2 - 18) and krypton ions in helium, nitrogen, argon, and krypton for ion velocities of $2.6 \cdot 10^8$ - $12 \cdot 10^8$ cm/sec were measured by mass spectroscopy with an apparatus described by V. S. Nikolayev et al. (ZhETF, 40, 989, 1961). The error was below ± 15%. The ions were scattered through angles of $\theta \lesssim 0.005$ radians. The $\sigma_p/\sigma_{i,i+1}$ ratios decrease rapidly with increasing ion velocity; σ_p denotes the total cross section of scattering through angles $\theta \lesssim 0.005$. The values of σ_{12}

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found by M. I. Korsunskiy et al. (DAN SSSR, 103, 399, 1955) for N ions in nitrogen are by 25% lower than the present results. The dependence of the impact cross sections with loss of an electron on ion velocity has the same character for all gases investigated. The cross sections for ions with i = 1 and i = 2, and for N ions with i = 3 and i = 4 attain maximum values. The velocity v_m which corresponds to the maximum cross section increases with increasing ion charge as $v_m \sim \gamma u$; $u = (2I/\mu)^{1/2}$, I = binding energy of the lost electron, μ = electron mass, γ = coefficient dependent on the medium. The cross sections $\sigma_{i,i+1}$ generally increase with Z. For a given Z, the cross sections decrease with increasing i as exp(-mi), where $m \sim 1$ at $v \sim 3 \cdot 10^8$ cm/sec for Z = 10 and Z = 18, and $m \sim 1.5$ for Z = 3 and Z = 12. Generally, the electrons are lost from the outer shell. For equal v/u, the $\sigma_{i,i+1}/q$ ratio is approximately proportional to $I^{-\alpha}$; α depends only slightly on v/u, and is near unity. q denotes the number of electrons in the outer shell. The dependences of the theoretical and experimental cross sections on v and I are qualitatively the same. Considering screening of the Coulomb field, the electron losses in light media at $v \geq u$ agree with the experimental value. For heavy media, the generalized Bohr formula is

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$\sigma_{i,i+1} \approx \pi a_o^2 q Z_c^{2/3} v_o^2/vu$, where $a_o = 0.53 \cdot 10^{-8}$ cm and $v_o = 2.19 \cdot 10^8$ cm/sec. The approximate theoretical results of O. B. Firsov (ZhETF, 36, 1517, 1959), which are applicable for $v \ll v_o$, differ from the present results by a factor of 2.5 at most. The experimental data indicate the correctness of the theoretical calculations for very small and very large ion velocities and also for the range $v \sim u$. In the range $0.5 < v/u < 1.5$, $\sigma_{i,i+1} \approx qI^{-1} f(v/u)$ holds according to Ya. M. Fogel' et al. (ZhETF, 32, 453, 1957). The general character of the dependence of $\sigma_{i,i+1}$ on v agrees with H. S. W. Massey's adiabatic hypothesis. The adiabatic parameter can be represented in the form $pa/\hbar$ or p/p_o according to G. F. Drukarev (ZhETF, 37, 847, 1959). $p = |\Delta E|/v$ denotes the change in ion momentum in inelastic forward scattering. There are 8 figures and 18 references: 10 Soviet and 8 non-Soviet. The four most recent references to English-language publications read as follows: S. K. Allison. Rev. Mod. Phys., 30, 1137, 1958; S. K. Allison, J. Guevas, M. Garcia-Munoz. Phys. Rev., 120, 1266, 1960; H. L. Reynolds, L. D. Wyly, A. Zucker. Phys. Rev., 98, 1825, 1955; S. Krasner. Phys. Rev., 99, 520, 1955.

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33991
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Experimental study of electron...

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of the Moscow State University)

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33993
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24.6712

AUTHORS: Teplova, Ya. A., Nikolayev, V. S., Dmitriyev, I. S., Fateyeva, L. N.

TITLE: Slowing down of multiply charged ions in solid and gaseous media

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v 42, no. 1, 1962, 44 - 60

TEXT: The ranges R, the specific energy losses dE/dx, and the straggling S of fast multiply charged ions of He, Li, Be, B, C, N, O, Ne, Na, Mg, Al, P, Cl, K, Br, and Kr ($2.6 \cdot 10^8$ - $11.8 \cdot 10^8$ cm/sec) with energies of 25 - ~700 kev/nucleon in hydrogen, helium, methane, benzene, air, argon, and various mixtures of these gases were measured. Moreover, the specific energy losses in celluloid, Al, Ni, Ag, and Au were measured for a wide range of Z and Z_c (Z = ion charge, Z_c = atomic number of the medium) by means of a multiwire proportionality counter. The ions were accelerated with a 72-cm cyclotron. The methods of measuring R and dE/dx have been

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presented before (Izvestiya AN SSSR, seriya fiz., 23, 894, 1959; ZhETF, 34, 559, 1958). Because of the small range and weak intensity of the ion beams of Be, C, Na, Mg, Cl, K, Br, and Kr, only their maximum ranges R" were measured. The relation $R = kv$ holds with an accuracy of 5 - 7% for ions with $Z \geq 2$ up to a certain maximum velocity v_m; k increases with Z as $\sim Z^{1/2}$. For ions of He to Ne v_m ranges from $5 \cdot 10^8$ to $8 \cdot 10^8$ cm/sec. In the velocity range investigated, R" increases not monotonically on Z but fluctuates periodically by $\sim 30\%$. The fluctuation amplitude decreases with increasing velocity. The dependence $R(Z_c)$ of N ions is similar to that of protons. With decreasing velocity, the absolute value of straggling S, becomes smaller but the ratio still $\delta = S/R$ increases. At constant velocity, the functions $S(Z)$ and $\delta(Z)$ are nonmonotonic. The fluctuations of $R(Z)$ and $S(Z)$ are explained by a considerable effect of the electron structure (filling up of the L and M shells, etc.) of the ions. The law of additivity of dE/dx in mixtures is fulfilled for multiply charged ions as well as for protons and α-particles. In the qualitatively valid relation $dE/dx \approx v^m f(Z_c, Z)$, m is near unity at velocities below $8 \cdot 10^8$ cm/sec.

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decreases with increasing velocity, and tends to -2 at $v \gg 12 \cdot 10^8$ cm/sec. $(dE/dx)_{max} \sim Z^{f(Z_c)}$ holds for any ion group. According to V. G. Tel'kovskiy et al. (DAN SSSR, 113, 1035, 1957), the experimental values of dE/dx for protons in Ag are 50% higher than the theoretical values O. B. Firsov (ZhETF, 36, 1517, 1959) found that $-dE/dx = 2.54(Z+Z_c)v \cdot 10^{-15}$ ev·cm^2/atom. Because of the electron structure of the ions, which becomes more and more distinct with increasing velocity ($v > v_o$), it is more convenient to use the Hartree-Fok method instead of the Thomas-Fermi model. At $v \gg u$ (u = velocity of orbital electrons of the medium), the calculation of dE/dx for inelastic collisions of protons in hydrogen with electrons from modified quantum-mechanical formulas of Bethe and Bloch, and from the classical formula of Bohr at $v \sim 4 \cdot 10^8$ cm/sec yields a value 5 - 7% smaller than the experimental values. For multiply charged ions, this applies to large v, but with increasing Z_c and decreasing v this theory deviates more and more from the experiment. S. S. Vasil'yev is thanked for interest, the cyclotron team, particularly A. A. Danilov,

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Slowing down of multiply charged...

M. Kh. Listov, and V. P. Khlapov for performing the experiments, and O. B. Firsov for discussions. There are 8 figures and 26 references: 8 Soviet and 18 non-Soviet. The four most recent references to English-language publications read as follows: P. G. Roll, F. S. Steigert. Nucl. Phys., 17, 54, 1960; D. J. Porat, K. Ramavataram. Proc. Phys. Soc., 77, 97, 1961; J. M. Alexander, M. F. Gazdik. Phys. Rev., 120, 874, 1960; P. G. Roll, F. E. Steigert. Phys. Rev., 120, 470, 1960.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

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34634
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AUTHORS: Teplov, I. B., Dmitriyev, I. S., Teplova, Ya. A., Shevchenko, O. P.

TITLE: Investigation of α-particle angular distribution in $Li^7(p,\alpha)He^4$ reactions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42, no. 2, 1962, 353 - 357

TEXT: The angular distributions of the α-particles from $Li^7(p,\alpha)He^4$ reactions were measured in the range 20 - 160° for E_p = 5.78, 6.13 and 6.35 Mev using a telescope arrangement of three proportional counters, and Li_2O targets 0.16, 0.54, and 0.92 mg/cm^2 thick corresponding to energy losses of 6-Mev protons of 5, 41 and 70 kev. The angular distributions were obtained as $d\sigma/d\Omega = (\sigma/4\pi)\left[1 + A_2P_2(x) + A_4P_4(x)\right]$ with

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E_p, Mev	a_2	A_2	A_4
6.55	-0.769	-0.767	-0.102
6.15	-0.357	-0.356	-0.010
5.78	-0.717	-0.693	+0.085

σ is the total cross section. The experimental results are satisfactorily described, even by $d\sigma/d\Omega = A_2 P_2(x)$. The excitation curves were measured for $5.45 \leq E_p \leq 6.55$ Mev (angle of α-particle emission: 30° - 90° in the c.m.s. 55°) and for $5.3 \leq E_p \leq 6.55$ Mev (60° or 90° in c.m.s.). From the resonance structure of the excitation curve of the $Li^7(p,\alpha)He^4$ reaction, it was found that the reaction takes place mainly via formation of a Be^8 compound nucleus. The excitation curve has two resonance peaks at 5.4 and 5.6 Mev. The first can be explained if it is assumed that in the Be^8 nucleus there is a 2^+ level with an excitation energy of [illegible] Mev and a level above the resonance range. The second can be explained if the Be^8 nucleus has a level with 22.3 Mev excitation energy of [illegible] Mev width, even spin and positive parity, most probably 4^+. There are 1 figure and 1

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Investigation of α-particle...

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references: 2 Soviet and 7 non-Soviet. The four most recent references to English-language publications read as follows: J. M. Freeman et al. Nucl. Phys. 2, 148, 1958; F. Ajzenberg, T. Lauritsen. Nucl. Phys. 11, 1, 1959; F. Hirst et al. Phil. Mag. 45, 762, 1954; J. H. Gibbous, R. L. Macklin. Phys. Rev. 114, 571, 1959.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universiteta (Institute of Nuclear Physics of Moscow State University)

SUBMITTED: June 18, 1961

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B102/B104

AUTHORS: Dmitriyev, I. S., Nikolayev, V. S., Fateyeva, L. N., Teplova, Ya. A.

TITLE: Study of the loss of several electrons by fast multiply charged ions

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 43, no. 2(8), 1962, 361-369

TEXT: Many-electron loss cross sections for multiply-charged ions of light elements with $Z \geq 3$ were measured in He, N, Ar, and Kr. The velocity of the ions was $(2.6\text{-}12)\cdot 10^8$ cm/sec (35 - 750 kev per nucleon). The cross sections were determined by mass spectrometry, using an apparatus described in ZhETF, 40, 989, 1961. Two-electron loss cross sections were determined for Li, B, C, N, O, Ne, Na, Mg, Al, P, and Ar, three-electron loss cross sections for N, Ne, Na, Mg, Al, P, and Ar, four-electron cross sections for N, Ne, P, and Ar, and five-electron cross sections for P and Ar. The first two had an error of 15-20%, and the last two had one of 30%. The

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